

IN THE CLAIMS

Please replace the claims as filed with the claims set forth below.

1. (Original) A master cylinder for a hydraulic disc brake comprising:
a housing defining a cylinder, the cylinder having a first and second end along its axis;
a piston received in the cylinder, the piston having a radial seal between the piston and cylinder;
a lever pivotably associated with the housing for pivoting between a rest position and an actuated position relative to the housing;
a push rod operatively associated with the piston and the lever to move the piston axially within the cylinder as the lever is actuated between the rest and actuated position;
a threaded engagement between a first end of the push rod and the lever, the threaded engagement being configured to cause movement of the rest position of the lever relative to the housing when a rotating force is applied to the push rod causing axial rotation of the push rod;
a first set of protrusions operatively associated with the push rod to rotate axially with the push rod;
a second set of protrusions nesting with the first set of protrusions, the second set of protrusions being fixed against rotation relative to the push rod when the rotating force is applied to the push rod; and
biasing means operatively associated with at least one of the first and second sets of protrusions to bias the protrusions into nesting engagement with the other inhibiting relative axial rotation therebetween.

2. (Original) The master cylinder of claim 1 wherein the first and second sets of protrusions are configured to have a plurality of nested engagement positions as the push rod is axially rotated relative to the housing, the rest position of the lever moving a select amount relative to the housing as the first set of protrusions is rotated relative to the second set of protrusions between adjacent nested engagement positions.

3. (Original) The master cylinder of claim 1 further comprising means operatively associated with the push rod for preventing movement of the piston relative to the cylinder as the rotating force is applied to the push rod.

4. (Original) The master cylinder of claim 1 wherein the first and second sets of protrusions extend radially.

5. (Original) The master cylinder of claim 4 further comprising a piston coupling enveloping a second end of the push rod and attached thereto to rotate with the push rod, the first set of protrusions being attached to an outer surface of the piston coupling.

6. (Original) The master cylinder of claim 5 further comprising an externally threaded insert threadably engaged with the caliper housing having an inner bore, the second set of protrusions extending radially inward from a surface of the inner bore and the piston coupling being received in the inner bore.

7. (Original) The master cylinder of claim 6 wherein the externally threaded insert further includes radially inclined gear teeth engaged with a worm, the worm preventing axial rotation of the threaded insert upon application of the rotation force to the push rod.

8. (Original) The master cylinder of claim 1 wherein the first and second sets of protrusions extend axially.

9. (Original) A master cylinder for a hydraulic disc brake comprising:
a housing defining a cylinder, the cylinder having a first and second end along its axis;
a piston received in the cylinder, the piston having a radial seal between the piston and cylinder;

a lever pivotably associated with the housing for pivoting between a rest position and an actuated position relative to the housing;

a push rod operatively associated with the piston and the lever to move the piston axially within the cylinder as the lever is actuated between the rest and actuated position;

a threaded engagement between a first end of the push rod and the lever, the threaded engagement being configured to cause movement of the rest position of the lever relative to the housing when a rotating force is applied to the push rod causing axial rotation of the push rod; and

indexing means operatively associated with the push rod for providing indexed axial rotation of the push rod upon application of the rotating force to the push rod causing axial rotation of the push rod.

10. (Original) The master cylinder of claim 9 wherein the indexing means prevents rotation of the push rod unless the rotating force applied to the push rod is greater than a select amount.

11. (Original) The master cylinder of claim 9 wherein the indexing means comprises a first set of protrusions operatively associated with the push rod and a second set of protrusions fixed against rotation relative to the push rod, the first and second protrusions being configured to have a plurality of nested engagement positions as the push rod is axially rotated relative to the housing, the nest position lever moving a select amount relative to the housing as the first set of protrusions is rotated relative to the second set of protrusions between adjacent nested positions.

12. (Original) The master cylinder of claim 9 further comprising means operatively associated with the push rod for preventing movement of the piston relative to the cylinder as the rotating force is applied to the push rod.

13. (Previously presented) A master cylinder for a bicycle hydraulic disc brake, the master cylinder comprising:
a housing defining a cylinder, the cylinder having a first and second end;
a hydraulic reservoir;
a port between the hydraulic fluid reservoir and the cylinder providing fluid communication between the hydraulic fluid reservoir and the cylinder, the port having a port opening located between the first and second ends of the cylinder;

a piston received in the cylinder having a radial seal, the piston being movable between a select starting position with the seal between the first end and the port opening with the seal a select distance from the port opening and a pressurized position with the seal between the port opening and the second end, the radial seal preventing fluid flow between the cylinder and the reservoir when positioned between the port opening and the second end to pressurize the second end;

a lever pivotably attached to the housing, the lever being operatively associated with the piston to move the piston between the select starting position and the pressurized position as the lever is pivoted between a rest position and a fully actuated position;

dead band adjustment means operatively associated with the piston for moving the radial seal to adjust the select distance between the port opening and the seal; and

compensating means operatively associated with the dead band adjustment means and the lever to maintain the lever in a select rest position as the dead band adjustment means is actuated to adjust the select distance between the port opening and the seal.

14. (Previously presented) The master cylinder of claim 13 further comprising a push rod having a second end operatively associated with the piston and a first end operatively associated with the lever to translate pivotal movement of the lever to axial movement of the piston within the cylinder, the dead band adjustment means comprising a threaded member threadably engaging the housing axially of the first end of the cylinder, the threaded member having an axial bore receiving the push rod, the push rod and threaded member being configured so that axial rotation of the threaded member in a first direction moves the push rod toward the second end of the cylinder and axial rotation of the threaded member in a second direction moves the push rod away from the second end of the cylinder.

15. (Previously presented) The master cylinder of claim 13 further comprising reach adjustment means operatively associated with the lever for varying the rest position to adjust the reach of the lever independent of movement of the select distance between the port opening and the seal.

16. (Previously presented) The master cylinder of claim 15 wherein the reach adjustment means comprises a push rod and a cross dowel, the push rod having a second end operatively associated with the piston and an axially threaded first end, the cross dowel being received in the lever for pivoting about a cross dowel axis transverse the axis of the cylinder, the cross dowel having an internally threaded bore transverse the cross dowel axis, the internally threaded bore threadably receiving the axially threaded first end of the push rod, whereby axial rotation of the push rod moves the cross dowel axially of the push rod to pivot the lever about its pivot to move its rest position to adjust the reach.

17. (Previously presented) The master cylinder of claim 14 wherein the first end of the push rod is axially threaded and the compensating means comprises a threaded connection between the first end of the push rod and the lever, the threaded connection being configured to maintain the lever in a select rest position relative to the housing as the threaded member and thereby the push rod are rotated in either of the first and second directions to vary the select starting position of the piston.

18. (Previously presented) The master cylinder of claim 16 wherein an axis of the internally threaded bore of the cross dowel does not intersect the cross dowel axis.

19. (New) A master cylinder for a bicycle hydraulic disc brake, the master cylinder comprising:
a housing defining a cylinder, the cylinder having a first and a second end along its axis;
a hydraulic fluid reservoir with a port between the hydraulic fluid reservoir and the cylinder, the port having an opening between the first and second cylinder ends;
a piston having a seal between the cylinder and the piston, the seal having a leading seal edge, the leading seal edge being movable relative to the port opening to vary a dead band distance between the leading seal edge and the port opening with the piston in an unactuated position;
a one piece lever pivotably associated with the housing and operatively associated with the piston for moving the piston within the cylinder between an unactuated and an actuated position as the lever is actuated between a rest position and an actuated position;

a reach adjustment operatively associated with the lever for varying the rest position of the lever relative to the master cylinder housing independent of movement of the leading seal edge relative to the hole as the reach adjustment varies the rest position of the lever.

20. (New) A method of varying a reach of a lever actuated bicycle hydraulic disc brake master cylinder, the disc brake master cylinder having a housing defining a cylinder and a port, a piston received in the cylinder, the piston having a seal between the piston and the cylinder wherein the distance between a leading edge of the seal and the port defines a dead band, the lever being one piece and being operatively associated with the piston, the dead band being variable independent of lever movement, the method comprising:

varying the reach of lever; and

maintaining a select dead band as the reach of lever is varied.

21. (New) A master cylinder for a bicycle hydraulic disc brake, the master cylinder comprising:

a housing defining a cylinder, the cylinder having a first and second end;

a hydraulic fluid reservoir;

a port between the hydraulic fluid reservoir and the cylinder providing fluid communication between the hydraulic fluid reservoir and the cylinder, the port having a port opening located between the first and second ends of the cylinder;

a piston received in the cylinder having a seal operatively associated therewith, the seal having a leading edge, the leading seal edge being moveable between a select starting position with the leading seal edge between the first end and the port opening with the leading seal edge a select distance from the port opening and a pressurized position with the leading seal edge between the port opening and the second end, the leading seal edge preventing fluid flow between the cylinder and the reservoir when positioned between the port opening and the second end to pressurize the second end;

a one piece lever pivotably attached to the housing, the lever being associated with the piston to move the piston between the select starting position and the pressurized position as the lever is pivoted between the rest position and a fully actuated position;

reach adjustment means operatively associated with the lever for varying the rest position of the lever with respect to the housing independently of movement of the select distance between the port opening and the leading seal edge; and

dead band adjustment means operatively associated with the piston for moving the leading seal edge to adjust the select distance between the port opening and the leading seal edge without varying the rest position of the lever.